

Stress and First Responders: A review of significance, mental health risk, and treatment strategies

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Senior Honors Thesis  
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May 29<sup>th</sup>, 2020

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## **Abstract**

This review compiles significant literature documenting the occupational health effects of stress on first responders. A series of situational factors make first responders more susceptible to stress such as their frequent exposure to traumatic events, the susceptibility to do shift work, the long hours worked per shift, and the instability of daily job requirements and expectations. As a result of the highly stressful environment these individuals face, many may experience fatigue, anxiety, depression, substance abuse and in many cases suicidal ideations and PTSD. Certain factors may serve to protect first responder individuals from some of these stress effects, such as more years working on the job and camaraderie among their team. Literature discussing management strategies for these mental health ailments offer a variety of treatment solutions, but to date, the body of literature surrounding the first responder population specifically is limited and does not provide sufficient information to guide adequate treatment for these individuals. There is no question that first responders face stressful situations as a result of their occupational demands, this truth is on display now as the COVID-19 pandemic rages on, and the literature is conclusive that a concerted effort needs to be made to provide better support options and improve cultural perceptions for first responders seeking help.

### **Acknowledgements**

This project was supported by the Tom and Elizabeth Long Excellence Fund for Honors administered by Honors Carolina and made possible by the University of North Carolina at Chapel Hill's Office of Undergraduate Research. I would like to say a special thank you to Dr. Sorensen for his patience and flexibility during these unprecedented times. I would like to thank Dr. Middleton for teaching me how to write and conduct research like a "real" anthropologist. I would also like to thank Dr. Hilton for serving on my committee and being a large part of my senior-year experience at Carolina. Finally, I would like to thank Jacob Griffin for his kindness and his unending support for students at UNC pursuing anthropology.

## **Introduction**

### **Background**

According to the National Emergency Number Association (NENA), it is estimated that 240 million 911 calls are placed annually in the United States (9-1-1 Statistics, 2019). Teams of first responders—police officers, firefighters, and Emergency Medical Services (EMS) personnel—are sent out to handle each of these 240 million calls and put their lives on the line for those in need. First responders undergo special trainings and complete certification exams in order to be deemed qualified to carry out their designated duties, but these operatives are far from impervious to the effects of such a stressful occupation. Usually, first responders are the first people to a scene to offer life-saving support and they face “challenging, dangerous, and draining situations” as a result of their occupation and associated stress (First Responders, 2018, 1). According to a 2015 national survey (Journal of Emergency Medical Services (JEMS)) of first responders, 37.0% of those surveyed considered committing suicide, compared to the CDC national average of 3.7% for non-first-responder individuals, likely as a result of this heightened occupational stress (Rose, 2015). Due to the high volume of calls per year, it is of the utmost importance that our first responders are able to work at their peak ability to provide effective care to those in need of their services.

Stress is a biological or physiological response to a stressor. Stressors can include a number of internal or external experiences that bring an individual out of a normal, homeostatic, state. An organism’s stress response in most cases is necessary for survival and is an evolutionary advantage designed to prepare an organism to respond to a threat (Boyce, 2005). However, when stress exposure becomes too frequent or severe it can cause chronic psychological stress and increased biological aging due to the associated negative health effects

(Aschbacher, 2013). The source of the stress examined in this review was an individual's experiences related to working as a first responder.

Several articles reviewed here also discuss burnout in association with the health effects that first responders may experience as a result of their stressful occupation. Burnout, “a defensive coping behavior in order to deal with psychological strain,” occurs as a result of exposure to chronic stress (Miller, 2019, 223). According to Miller (2019, see below), ‘burnout’ is comprised of three elements: “emotional exhaustion, depersonalization, and low personal accomplishment” (Miller, 2019, 223). First responders are considered to be at higher risk for burnout not only due to their specific job requirements, but also because their job often requires shift work and can lack supervisory support (Miller, 2019).

It is not surprising for people to hear that working as a first responder is a stressful experience day-to-day. These individuals are directly responsible for entering unknown circumstances, assessing a situation, and often confronting violence or severe injury. For many, this kind of burden is an unthinkable undertaking, but for some, it offers a proud and meaningful way of life. It is inevitable that first responders will experience stress during the course of their work-day, and it is necessary for effectively serving the integral role that they do. Chronic stress exposure though, can lead to a range of negative consequences for both physical and mental health and can have significant consequences for processing any stress.

For example, many first responders also experience effects of posttraumatic stress disorder (PTSD) resulting from heightened occupational demands (Ebersole, 2019). Public outcry has risen in order to grow awareness for this increasingly prevalent issue of chronic stress leading to detrimental health outcomes among first responders, to remove stigma from our

“heroes” seeking help, and to improve the resources available to them when they do (Rose, 2015).

Several articles assess first responder stress qualitatively such as the 2019 Los Angeles Times Article, “Must Reads: Firefighter Suicides Reflect Toll of Longer Fire Seasons and Increased Stress.” Other works, like the 2015 Reviving Responders article, “What’s Killing our Medics,” explore the effectiveness of various methods of intervention for these first responders experiencing stress and try to identify the best intervention strategy to reduce occurrences of conditions such as depression, anxiety, and suicidal tendencies in first responders (Abbot, 2019). This study provides additional evidence for the need for procedural solutions to mitigate the effects of stress among first responders.

### Current Review

The purpose of the current review is to explore the existing literature surrounding occupational stress among first responders and highlight common findings and recommendations for intervention and stress management. This review is incredibly timely considering the current global state as a result of the coronavirus disease of 2019 (COVID-19). Now more than ever it is imperative to ensure that healthcare workers are being adequately supported so that they can continue to provide life-saving care to so many people across the globe.

My interests in this topic occurred when I became a certified Emergency Medical Technician (EMT). Throughout my training program I completed several modules centered around self-care and informing future EMTs of the importance of seeking help if we found ourselves struggling with the demands of our job—not to become a second victim. My personal experiences working as an EMT underscore how stress among EMS members is an issue due



serious attention. EMS personnel make sacrifices on a daily basis in order to serve others and they deserve to be treated with this same respect when they too experience times of suffering. How stress affects this population is clearly an important issue, and taking steps to ensure first responders are afforded appropriate care to manage their stress is a necessary endeavor. It is because these responders care so much for the greater good of their community that they experience such profound effects from their responsibility to protect it.

The stakes of research such as that discussed in this review are exceedingly high. It has never been clearer than it is today how integral our healthcare system and first responder team are to the greater functions of society. Virtually everyone, whether directly or indirectly, relies on first responders at some point or another for life-saving aid. To this end, it is clear how important it is that these individuals are protected in such a way that they are able to perform at their peak capacity when called. This can be accomplished by implementing safer working conditions through the mitigation and management of occupational stress and mental health concerns associated with traumatic work experiences discussed below.

### **Physiological Effects of Occupational Stress for First Responders**

#### **Overview**

The Substance Abuse and Mental Health Services Administration conducted an extensive review of many of the negative health outcomes that first responders are at risk for due to their demanding job requirements (SAMHSA, 2018). This review breaks first responders into groups, discussing Emergency Medical Services (EMS) personnel, firefighters, and police officers separately. In each of the three groups, depression, stress and posttraumatic stress

disorder/symptoms, and suicide/suicide ideation were reported. Among firefighters and police officers substance abuse was also indicated as a key behavioral health malady.

Juster (2010), while not specific to first responders, discusses the effects of chronic psychosocial stress generally. Among the negative health outcomes associated with chronic stress, Juster (2010) includes accelerated aging and increased negative disease outcomes as additional concerns. Accelerated aging and increased susceptibility to morbidity is resultant from the taxing effects of chronic stress on an individual's physiological response system. This evidence is also supported by Aschbacher (2013, see above).

The repeated exposure to heightened stressors, seen in such a demanding profession as a first responder, takes a toll on one's body. As a result of this occupational stress, a person's entire stress response system has the potential to be skewed or even blunted. A person's baseline for stress may be altered or their responses may be delayed. Both of which can lead to an increase in a person's allostatic load, or the cost to them as a result of this repeated chronic stress. Allostatic load can be thought of as the "wear and tear" an individual incurs as a result of experiences of successive stressful events (Juster, 2010; McEwen, 1993).

### Risk Factors

Many articles included in this review discuss the risk factors in first responders experiencing stress and negative health effects due to this occupation. Several major risk factors that have been identified include: demographic background, gender, prior mental illness, negative pre- or post-trauma life events, perceived lack of social support, frequent exposure to trauma, and exposure to shift work (Duarte, 2006; Kleim 2011; Mayo Clinic, 2018; Stanley, 2016; UCF Researcher, 2016).

Several risk factors seem unsurprising. For example, if you are more frequently exposed to traumatic events, you have more opportunities to have a negative experience trying to cope with one of them. Prior mental illness may increase susceptibility to suffering from additional negative mental health outcomes. In other cases, potential risk factors are not as clear-cut. For example, gender—being a woman—is considered a risk factor among firefighters and dispatch workers, but not among law enforcement professionals (UCF Researcher, 2016). Demographic influences are even more disparate and can have different effects when dealing with different situations and even among different first responder groups. For example, in one study, younger and single responders were shown as more likely to develop acute stress disorder (Kleim, 2011), while another found that marital problems can be a significant influence in a responder contemplating suicide (Stanley, 2016). Individuals of certain races may feel more significant effects of certain mental health disorders as well due to dissimilar cultural expectations and sociodemographic position.

#### Post Traumatic Stress Disorder (PTSD) Risk Among First Responders

Several of the main negative health outcomes that first responders can experience in their line of work are effects from Post Traumatic Stress Disorder (PTSD). PTSD is a mental health disorder triggered by the experience of a traumatic event and one that persists over time after the event concluded (Mayo Clinic, 2018). PTSD may present with intrusive memories that interfere with daily life, avoidance, negative changes in thinking and mood trending towards depression, changes in physical and emotional reactions, and thoughts of suicide (Mayo Clinic, 2018). One of the risk factors for developing PTSD is having a job that increases your likelihood of being exposed to traumatic events, like a first responder (Mayo Clinic, 2018).

The 2019 Washington Post Article, “First responders struggle with PTSD caused by the emergencies, deaths, tragedies they face everyday” by Rene Ebersole follows first-hand accounts of first responders recalling personal experiences dealing with tragedy on the job (Ebersole, 2019). The accounts in this article are chilling and highlight a need for counseling and support for first responders affected by PTSD—by assert that first, our culture needs to change how they view first responders.

This article raises the idea that first responders are viewed in a “hero culture” where they are commended for enduring physical injury, but shamed for displaying mental weakness in handling the things they see (Ebersole, 2019, 4). This can exacerbate the issues associated with their occupational stress and worsen their chances at seeking support and coping effectively. One expert cited in the article suggested some individuals may turn to alcohol as an ill-advised coping mechanism instead. Surprisingly, a 2017 survey of 2,000 first responders reported ~40% of individuals expected to face negative repercussions at work should they pursue mental health services (Ebersole, 2019).

The article discusses how critical disasters can have significant effects on first responders, but so can their day-to-day duties responding to “horrible things” (Ebersole, 2019, 2). It goes on to define traumatic events as those where a person “experiences or perceives a threat of death or injury for themselves or others” which can cause stress, fear, helplessness, and hyper-vigilance (Ebersole, 2019, 4). This type of experience is not uncommon for first responders and recently a shift has been made to focus on the need for the approval of legislature offering workers support and compensation to seek help after experiencing traumatic events. This article asserts though that the current efforts are not enough to relieve pressure on lawmakers to do right by these individuals (Ebersole, 2019).

Further discussion of the recommended treatment and intervention for individuals suffering from PTSD is included in the Intervention Strategies section below.

### Suicidal Ideation

As a result of the stress first responders face, they are also at a significantly higher risk for having suicidal ideations. As mentioned in the intro: According to the Journal of Emergency Medical Services (JEMS) 2015 survey of first responders, 37.0% of those surveyed considered committing suicide, compared to the CDC national average of 3.7% for non-first-responder individuals (Rose, 2015). This is a significant, ten-fold increase among this population compared to the general public.

That article looked at something they called critical stress (CS), they also documented the number of EMS providers who had considered or attempted suicide and finally, they attempted to quantify how effective current support methods were for providers. The latter topic will be discussed in the following section. Critical stress was defined in the survey as: “the stress we undergo either as a result of a single critical incident that had a significant impact upon you, or the accumulation of stress over a period of time” (Rose, 2015, 2). After compiling 4,022 responses, they found that: 86% of respondents experienced CS, 37% had contemplated suicide, and 6.6% had attempted to commit suicide. Researchers were shocked at how high these results were and concluded unequivocally that stress among EMS providers in the United States was extreme (Rose, 2015).

The above article appears to be an excerpt taken from the larger document: “What’s Killing Our Medics,” by Cord Abbott et al (Abbott, 2015). This article also identified that CS had a significant emotional impact on EMS providers independent of the number of years they’d

served on the job. Finally, in terms of CS, this study also identified that “cultures that didn’t support their employees through Critical Stress had higher rates of suicide contemplation and attempts.” (Abbot, 2015, 4)

In the 2019 Los Angeles Times article, “Must Reads: Firefighter Suicides Reflect Toll of Longer Fire Seasons and Increased Stress” it was reported that at least 115 firefighters and EMS personnel in the US committed suicide in 2017 (Agrawal, 2019). It also shows a trend of documented suicides increasing since 2005. Chillingly, this result also reveals that more firefighters took their own lives than died in the line of duty during the same period (Agrawal, 2019). The purpose of this article was to highlight this contrast since they believed that the opposite trend seemed to be displayed almost exclusively in the media. One woman quoted in this article put the kind of stress firefighters experience into perspective, saying something to the effect of: firefighters are exposed on a regular basis to everyone else’s worst day (Agrawal, 2019).

In the 2016 article, “A systematic review of suicidal thoughts and behaviors among police officers, firefighters, EMTs, and paramedics” additional evidence was provided in support of the fact that first responders experience heightened instances of suicidal ideations as a result of their occupational demands (Stanley, 2016). This extensive review details the specific rates of suicide and suicidal ideation along with key findings across 63 quantitative studies and categorizes the findings for each responder group individually. The experiences faced by first responders bring them close to death-related experiences on a regular basis, this can lower an individual’s fear of death and make suicidality more likely (Stanley, 2016). Additional risk correlates reported in this review included: occupational hazards and exposures, access to firearms and other weapons, inconsistent shift schedules, stigma limiting utilization of services, a

focus on protecting others before themselves, and often concurrent or past military experience (Stanley, 2016).

Other studies reviewed proposed theories of occupational factors that contribute to the increased risk of suicidal ideation among first responders. These included: occupational dissatisfaction; stress and burnout; career transitions; and sleep disturbances. Individuals synchronously facing marital problems were reported to be five times more likely to have attempted suicide than those who did not report problems (Stanley, 2016). Several protective factors were also identified though. These included: camaraderie, familial support, organizational support, and a sense of purpose. However, these protective factors were considered less influential on an individual than the risk factors he or she may face compelling them to consider taking their own life (Stanley, 2016).

### **Review of Stress Management Strategies**

#### **Overview**

I'd like to be able to list something like the four most common and effective intervention strategies for first responders dealing with on-the-job stress, however, this consensus does not seem to exist in the literature. In fact, even articles that seem to be recommending the same type of treatment strategy often call it something different or have a slightly nuanced method for implementing it. Some researchers have conducted studies to show why their suggested intervention strategy works best, others call for further research to replace outdated treatments, and others offer general comparisons of what support plans have been shown to work better or worse than others.

In The Substance Abuse and Mental Health Services Administration's review the intervention strategies for reducing behavioral health risks in first responders were explored. This article offered recommendations based on first-responder-centered research results and indicated that the most important considerations were based on how well individuals prepared for stressful situations and how they responded during the event. The two most important recommendations for a first responder preparing to take on a stressful job-related situation were to "Be aware of personal vulnerability and signs of burnout and compassion fatigue" and to "Make plans prior to the disaster for self-care during the disaster response" (SAMHSA, 2018, 11). During and after the response the recommendations were for teams to communicate and assess the status of their members, allowing them time to be open about and cope with any concerns they may still have before moving onto their next work-related task. According to this review, mental health and resilience training should be provided and counseling and debriefing should be encouraged for anyone who experienced a particularly traumatic event.

This paper concluded that to improve first responder health outcomes, organizational leadership and coworkers must mount a cooperative effort to ensure that adequate training is provided to individuals (SAMHSA, 2018). This is to ensure the resiliency and health of first responders by offering protection from overwork and excessive stress. Education for how their job can affect their mental health and support for individuals seeking help are key for any of these intervention strategies to be successful. This section represents several of the main takeaways from similar research.



## Recommendations for Prevention of Mental Health Distress

Some believe that the best way to protect a first responder from the effects of stress from their occupation is through training and education prior to ever facing a traumatic experience. The SAMHSA article discussed above also offers a list of protective factors that can help to reduce stress and other negative health outcomes among first responders (SAMHSA, 2018). These are broken up into pre-disaster, during disaster, and post disaster protective factors. Prior to responding to an event, the most significant protective factors that could act in an individuals favor include, having worked on the job for a longer period of time, higher job satisfaction, specialized training, higher levels of professional mastery, confidence in personal and team effectiveness, and resilience (SAMHSA, 2018). During the event, social and organizational support, supportive and approachable leadership, and camaraderie were also linked to better health outcomes (SAMHSA, 2018). After the event, results are inconclusive, though peer support seems to show positive results most often. In some cases mental health treatment such as through critical incident stress debriefing (CISD) and/or psychological counseling were found to be helpful and in other cases they were found to be intrusive and distressing (SAMHSA, 2018). Several other studies offer similar suggestions that protective factors may play a significant role in shielding first responders from the negative effects of stress (Juster, 2010; Kleim, 2011; Miller, 2019)

This article also reports evidence of a few intervention methods also showing promise as protective factors and treatment strategies. For example, psychological First Aid training was shown to increase resiliency for public health personnel, resilience training reduced stress and seemed to improve job performance among special forces police officers, peer-support groups have also been shown to amount to a cultural shift allowing people to feel comfortable to talk

about and express what they are dealing with (SAMHSA, 2018). Refresher courses may be needed to maintain the efficacy of these programs, but they are believed to work and could make a significant positive difference in the health outcomes of this population (SAMHSA, 2018)

The Robert-Paul Juster article discussed above, “Allostatic load biomarkers of chronic stress and impact on health and cognition,” defines resilience as “a state of adaptation to a lifetime of stress and strain,” something that can occur among populations of first responders (Juster, 2010, 13). This article argues that certain protective factors can defend against the “age-related health and cognitive declines” described in the above section, including improved sleep quality/quantity, social support, increased sense of purpose, improved self-esteem and diet, substance avoidance, and physical activity. These are steps that a single first responder can take to improve their individual health.

The 2017 article “Role of Resilience in Mindfulness Training in First Responders” explores another side of treatment that is more holistic in scope (Kaplan, 2017). Results of this study indicate that first responders who completed an 8-week Mindfulness-Based Resilience Training (MBRT) increased their mindfulness and that this had an indirect link to increasing resiliency and reducing burnout (Kaplan, 2017). Researchers of this study suggest that these results illustrate that increased psychological resilience can diminish the negative impacts of occupational stress among first responders (Kaplan, 2017).

Others contend that some of the most significant decisions surround when treatment should be administered and to whom (Kleim, 2011). Researchers seem to disagree whether the most effective treatment methodology is to provide care before or after a traumatic event or whether both is preferable. There is also contention surrounding whether the seemingly most at-

risk individuals should be targeted for providing care, or whether prevention and treatment in less affected individuals is more beneficial (Kleim, 2011).

### Treatment for PTSD in First Responders

The 2012 review, “Treating posttraumatic stress disorder in first responders: A systematic review” identifies first responders as a population at significant risk for experiencing effects of PTSD due to the traumatic nature of many of their daily routines (Haugen, 2012). Across their review, researchers identified 2 studies that included randomized control trials (RCTs) of PTSD treatment for first responders (Haugen, 2012). Although a significant body of literature exists surrounding psychological treatments for PTSD for different populations, very little research has been conducted among first responders specifically. This is surprising due to their well-known risk of developing PTSD.

Among other populations, psychological treatments that have shown success in improving symptoms include cognitive behavioral therapy, eye movement desensitization reprocessing, prolonged exposure, and stress inoculation therapy (Haugen, 2012). Guidelines exist for different populations for appropriate treatment methodology, though some controversy exists surrounding some of the intervention recommendations. Medication has also been shown to lessen the effects of PTSD in some populations (Haugen, 2012). Guidelines are also available for more holistic approaches combining pharmacological and psychosocial treatments. This review reports thought that the same breadth of research has not been conducted in the case of first responder populations. In fact, they found the distinct lack of research on this topic to be considerably surprising (Haugen, 2012).

This article offers several potential explanations as to why such little research exists on this topic and concludes by petitioning to readers for additional PTSD studies to be conducted among first responders to improve their treatment outcomes in the future. Today, they recommend treatment which appears to have “the strongest preliminary evidence for efficacy with this population: CBT and BEP” (cognitive behavioral therapy and brief eclectic psychotherapy) (Haugen, 2012).

### Not all Intervention Strategies are Equally Effective

Some articles, through conducted studies or literature reviews argue not just for the implementation of one intervention strategy, but also compare strategies to one another to determine relative effectiveness. One review in particular that deliberately compares different intervention strategies head-to-head is, “What’s Killing our Medics?” (Abbott, 2015) One result that I found particularly interesting from this article indicates that not all intervention strategies aimed to support EMS members struggling with occupational anxiety or depression actually succeed (Abbott, 2015).

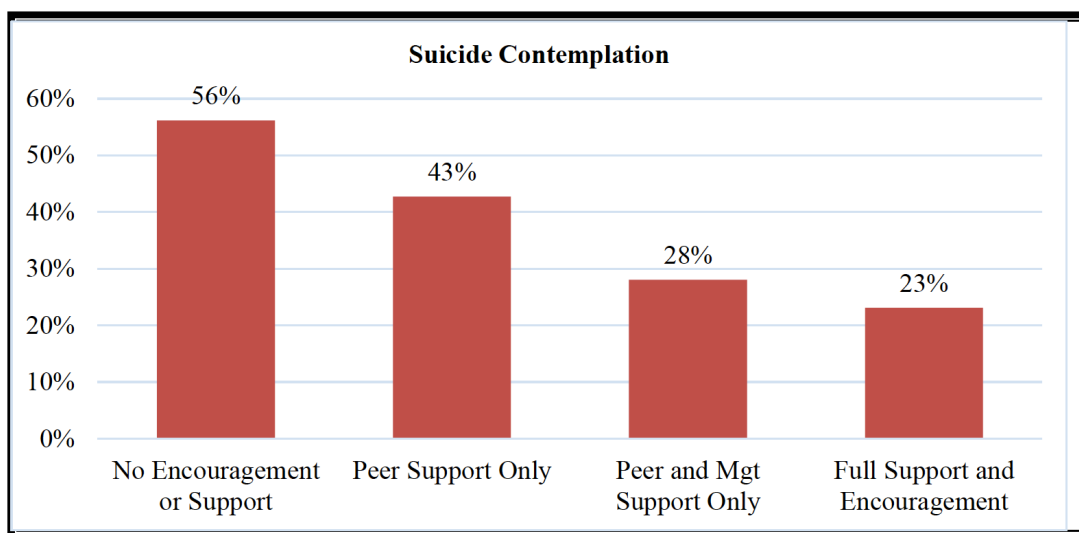


Figure 1. This figure shows the percentage of individuals who contemplated suicide after being counseled with various levels of intervention and support (Abbott, 2015, 16)

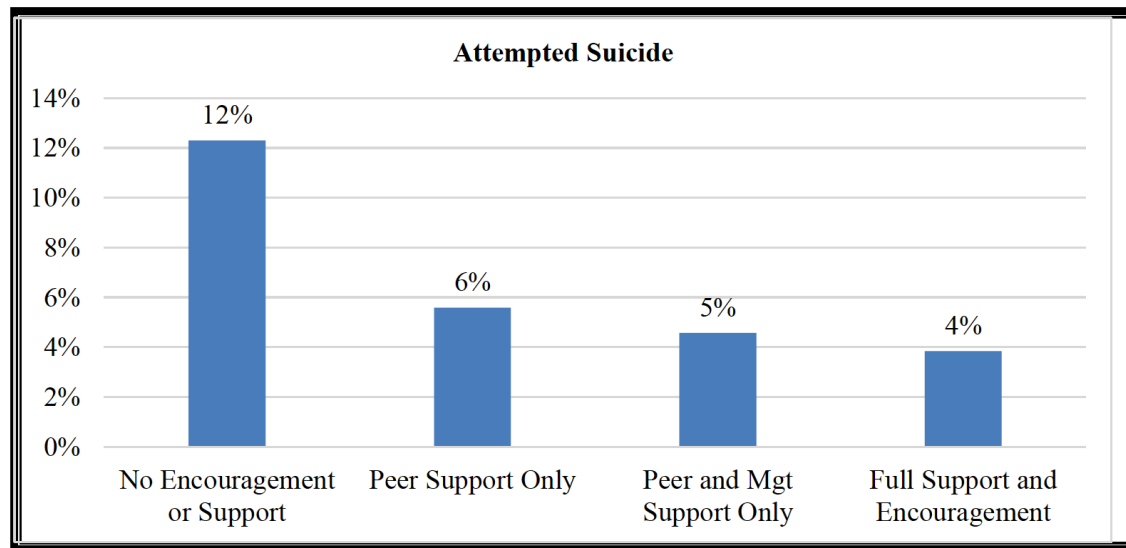


Figure 2. This figure shows a similar trend as the graph above. This shows the percentage of individuals who attempted suicide after receiving counseling from some source (Abbott, 2015, 16)

The values represented in Figures 1 and 2 are self reported and are subject to be misreported in an environment where speaking openly about these topics is not encouraged. This data showed that suicide contemplation and attempts were significantly higher when individual's were in an environment that did not support proper mental health and treatment, and that individuals who were in a more supportive and encouraging environment also reported the efficacy of help offered as higher (Abbott, 2015).

This study found that the most effective intervention strategy for EMS individuals dealing with CS and mental health problems related to their work was counseling or therapy

from a trained professional (Abbott, 2015). This result supports the idea that the effects of stress on these individuals are significant and have real and lasting effects on their physiology that cannot be easily reversed. It also supports the idea that assistance for this population of individuals is key and can make a significant difference in their long-term success and health. Above all else however, this review concluded that peers and administrators may have the most significant effects on a provider's day-to-day experience and therefore must be reeducated on how to and the importance of supporting each other (Abbott, 2015).

Another article, "Stress and First Responders: The Need for a Multidimensional Approach to Stress Management" backs the efforts that have been made to preserve the well being of first responders through individual coping skills (Reynolds, 2007). However, the author contends that this alone is insufficient to help this population combat stress effectively. In order to successfully mitigate the effects of stress you must be keenly aware of the source of it, which includes organizational factors in this case (Reynolds, 2007). Additionally, according to this paper, intervention should be conducted in a multi-staged and comprehensive manner; they argue that only a holistic approach can productively improve the health outcomes of first responders (Reynolds, 2007).

#### Different Strategies Work Better for Different First Responder Populations

Anastasia Miller, a researcher at the University of Central Florida, studies first responders and how they can avoid burnout and better manage their stress (UCF Researcher, 2016). Her research is lauded as being the first of its kind in Florida and several news articles are available reviewing her work and commending her aim of showing quantitative evidence for the need to better support the first responder population. She encourages other researchers to get involved and do the same.

Miller has become an advocate for including dispatchers in the conversation when considering “first responder” needs and argues that others have overlooked them in previous research. From what I have found in compiling this review, I am inclined to agree with her. Her research seems to be the most extensive on this topic and most focused on stress and first responders specifically, assessing their risk of burnout, and trying to quantify the best intervention strategies to offer the most effective help.

Her study published in the article, “Individual and organizational influences of the professional quality of life of Florida public safety personnel: A comparison of the fields” is most relevant to this review and offers data critical for determining the proper intervention strategies for supporting first responders in their roles (Miller, 2019). This study involved the cross-sectional administration of a survey to law enforcement, firefighters, EMS workers, and dispatchers. A total of 1,360 individuals responded to the survey along with the Perceived Coworker Support Survey, Survey of Perceived Organizational Support, and the Brief Resilience Survey (Miller, 2019). Results showed that, “60 percent of first responders displayed low levels of secondary traumatic stress, 39 percent displayed moderate levels and 1 percent displayed high levels” and these surprisingly high rates confirmed for Miller the stakes of this research and the significant need for providing constant support for these individuals (UCF Researcher, 2016, 2).

Unsurprisingly, this survey revealed that different first responder groups, e.g., firefighters compared to EMS personnel, cannot be thought of as equal when designing stress management strategies for them. That being said, many of the data from this paper showed dissimilar trends. For example, law enforcement personnel age was found to be inversely related to incidences of burnout, however, these trends did not hold for other first responder groups (Miller, 2019). In general, burnout was seen at higher levels among dispatch and EMS personnel than the other two

responder groups (UCF Researcher, 2016). The gender of the individual also had the power to have a significant impact on the critical stress levels individuals experienced. Women were shown to have higher levels of critical stress among firefighters and dispatch members, lower critical stress among EMS personnel, and no significant relationship was seen between critical stress and gender among law enforcement (UCF Researcher, 2016). An exception to this, and one way the results across all four populations were similar, was that perceived organizational support and psychological resilience was linked to positive results for individuals.

While each of these factors and trends differed across responder groups, perhaps the most interesting difference is in how the success of treatment of critical stress and burnout differs among each group. For example, firefighters were shown to benefit more from verbal communication among each other while law enforcement benefited more from formal stress management debriefings (UCF Researcher, 2016).

Several other factors were shown and detailed in this article to have different protective and/or detrimental effects to first responder personnel's health. Some treatment strategies, similar to those discussed above, were also presented with varying degrees of success. Because individuals in each group are influenced so differently by different factors, such as gender and burnout, it makes sense that their treatment would need to be tailored differently as well. These findings highlight the need for further research into this topic to ensure that when support and care for these at-risk individuals is provided, it is done so in the most effective manner.

This study was limited due to the characteristic biases that affect response rates to surveys in general. The survey was considered to be readable and reliable though there are concerns about the generalizability of these results outside of Florida. There is also concern that



due to the cultural norms surrounding these individuals, some of the answers reported may not have been entirely accurate.

### **Broader Implications**

#### **Evolutionary Significance of the Stress Response**

A topic that repeatedly grabbed my attention when I was conducting this review was how blunting and other negative effects associated with chronic stress exposure affected an individual's evolutionary fitness. The normal stress response obviously has vital functionality for humans and I was interested to see how alterations to that response process could affect individuals working particularly stressful jobs, like first responders. My hypothesis was that this decrease in reactivity of the average stress response would have a negative effect on individual fitness and overall reproductive success.

A focal paper on this topic, “Biological sensitivity to context: I. An evolutionary—developmental theory of the origins and functions of stress reactivity” by W. Thomas Boyce and Bruce J. Ellis explored the evolutionary necessity of a proper stress-response non-specifically to first responders. The key findings of the Boyce et al. 2005 paper, indicate that an individual's stress response is environment-dependent and liable to change over time (Boyce, 2005). This paper explains the evolutionary history of the biological stress response as follows, “an elaborated, highly coordinated, but phylogenetically primitive set of neural and peripheral neuroendocrine responses, designed to ready the organism for external challenges and threats to survival” (Boyce, 2005, 24). This supports the idea that blunting of this response is surely detrimental to the overall fitness and survival rate of a given organism. He furthers this idea to say, that the “protective effects within specific developmental ecologies might explain the

conservation of such phenotypic variation within evolutionary history” for high stress reactivity (Boyce, 2005, 24). These results indicate that repeated, elevated stress exposures are not good for an individual from an evolutionary standpoint, supporting my hypothesis.

Although activation of the sympathetic nervous system in order to literally “run from tiger,” as some UNC educators put it, is no longer necessary for most of us, this stress response is still integral to our appropriate biological functioning. These findings support my hypothesis and indicate that there is an evolutionarily-sound argument against exposing someone to these extreme levels of occupational-stress, perhaps not exclusive to healthcare professionals.

Additionally, knowing that these effects have led to an increased number of first responder suicides, this indicates that there is a negative selective pressure for the survival of these individuals. Assuming that many of the genes that make these individuals well-suited for this type of occupation are heritable, this also indicates that there are fewer and fewer individuals being born into the next generation that may fill these rolls, placing an even higher demand on those who do. This will further increase the stress effects and presumably strengthen the selective pressure against these individuals.

#### How the First Responder Role Affects Others

Beyond the individual risks faced by first responders, the effects of their stress and trauma can extend to their family members. A 2006 study published in the Journal of Traumatic Stress surveyed 8,236 public school children in New York, examining their mental health concerns six months following the 9-11 attack (Duarte, 2006). Probable PTSD among these children was assessed using the “PTSD screening module of the Diagnostic Interview Schedule for Children (DISC) DISC Predictive Scales (DPS)” (Duarte, 2006, 302). Children were asked

of any of their family members worked in particular occupations with check box options including: police officers, firefighters, and emergency medical technicians. The results of this study found that those children with EMTs in their family had high incidences of probable PTSD. These results were also standardized to take into consideration trauma not related to their concern for their family member following September 11<sup>th</sup>. Interestingly, children with police officers in their family had a similar rate of probable PTSD to those individuals without a first responder in their family, and those with firefighters in their family had the lowest rate overall (Duarte, 2006). Though it was believed that some of these differences in stress response could also be explained by sociodemographic differences among the respondent children.

Reported limitations of this study included: it was not possible to determine the number of first responders in each child's family or their relationship to the child, it was also not possible to determine the exposure information or mental health condition of the first responder individual, and the sample size likely interfered with the precision of the results (Duarte, 2006). However, this study called for additional studies to potentially confirm a need for additional mental health support, not only for first responders themselves, but children of EMTs at least.

### Why Should You Care?

For anyone with a personal connection to a first responder, for example, you or a loved one works in this capacity, addressing their potential occupational health risks is clearly a pertinent issue. But, perhaps intuitively, it is clear that this issue concerns a much broader population than first responders and their immediate family alone. As a society, we rely on our emergency personnel to take care of us in times of need. Turning a blind eye to the increased stress exposure and risk among this population—not considering the morality of that decision—likely will have far reaching detrimental effects on society as a whole. If we find ourselves

questioning the mental acuity of these individuals as a result of lack of sleep, lack of preparedness, traumatic conditions, or any of the above described risk factors, we can no longer feel comfortable in trusting them to make effective, life and death, decisions as their job requires them to do on our behalf.

Additionally, you do not have to be an emergency responder to experience chronic stress as a result of your occupation. Anyone in a variable high stress job should be invested in the broader implications of this review and the future policies that may be put into place to combat this. Many of the negative health outcomes as a result of chronic stress and recommendations for mitigating these are not unique to first responders.

### **How these Considerations Manifest Today**

#### **Background on Coronaviruses**

Severe acute respiratory syndrome coronavirus (SARS-CoV) and Middle East respiratory syndrome coronavirus (MERS-CoV) are two types of coronavirus, an exceptionally virulent group, to humans, of pathogenic viruses (Boni, 2020). Both are known to spread worldwide very quickly. They have high mortality rates for humans relative to other viruses though this can vary among demographics of people. Both of these are zoonotic in origin and have evolved the viral ability to cross between different species (Lu, 2015). This key point has become especially important in the last ~20 years as coronavirus outbreaks have been documented widely among human populations (Sun, 2020).

The most recent coronavirus outbreak, the coronavirus disease of 2019 (COVID-19) originated in Wuhan, China and was documented as early as December 31<sup>st</sup>, 2019 (WHO, 2020). COVID-19 has been found to replicate more quickly than SARS-CoV and MERS-CoV and it

can present asymptotically in individuals, making it more likely to be transmitted (Sun, 2020). Resultantly, the number of confirmed COVID-19 deaths to date exceeds 300,000 individuals worldwide (Coronavirus, 2020).

### Overview of How this Relates to Stress and First Responders

Today, the need for our first responder team to perform at their peak performance level and to be protected from adverse health outcomes is more apparent than ever. With the ongoing COVID-19 pandemic, our reliance on first responders is at the forefront of many people's minds. The recognition of this is almost universal: restaurants are offering free and reduced prices to healthcare workers and first responders; people are posting signs on their lawns; entire towns are cheering for and celebrating these hard-working folks. The unselfish nature of the first responders who are willing and able to continue working today is inspiring, many of whom are forgoing seeing family and friends and choosing to isolate alone to protect the people they love while serving the community they have sworn to protect.

With this outbreak being fairly recent, most literature available today concerns how COVID-19 is impacting health professionals, like EMS personnel, less research has been conducted highlighting the effects this will have on other first responders: firefighters; police officers.

### COVID-19 Literature Associated with First Responders

In the 2020 article, "The impact of the COVID-19 pandemic on the mental health of healthcare professionals" Felipe Ornell discusses the coronavirus history in relationship to the effects felt by first responders (Ornell, 2020). He explains that during the SARS outbreak of

2003, 18-57% of healthcare providers experienced serious emotional and psychiatric problems during and after (Ornell, 2020). During the MERS outbreak in 2015, dysphoria and stress were seen among the same population. Again during an epidemic beginning in Korea in 2016, Ornell sites that “The Burnout syndrome was also reported by health professionals involved in assisting patients during” that time, as a result of extreme emotional exhaustion brought on by the pandemic (Ornell, 2020, 2).

As discussed above, first responders are often at an increased risk for developing PTSD as a result of their occupational stress exposure and this persists beyond a working period. This threat of PTSD seems to apply not just in cases of prolonged, chronic, occupational stress, but also for any healthcare workers involved in responding to and managing an epidemic (Ornell, 2020). These effects can also be persistent, leading to high levels of stress, depression, anxiety, and PTSD after the emergency response has concluded (Ornell, 2020).

Vicarious traumatization or secondary traumatic stress, a condition discussed further later in this section, is a phenomenon in which healthcare workers begin to sympathetically show symptoms similar to that of their patients and is common during disaster response. What can be seen more so in the case of COVID-19 is the grandiose-izing of health professionals as faultless heroes. Ornell argues that this can be just as dangerous, adding further stress to these individuals, and perpetuating many of the negative health outcomes they are known to ail from (Ornell, 2020).

In combatting such issues, this study provides a number of recommendations for healthcare workers, agencies, and government officials. It calls for the provision of psychiatric treatments to those who may need it, mental health professionals to evaluate symptoms of pandemic-induced stress exposure, same environmental conditions including training on how to

properly utilize PPE (Ornell, 2020). Overall, the take home message seems to be pushing for policy change on the part of the healthcare system at large and governmental intervention. Communication, creating an environment of respect for individuals expressing feelings and symptoms, increased psychoeducation, and direction for identifying post-traumatic stress, anxiety, and depression in oneself and others are recommendations believed to have a significant effect (Ornell, 2020). Finally, at the end of an epidemic it is also recommended to create a safe space for expressing one's feelings in order to prevent burnout. This burden to implement change for the best interest of healthcare providers lies with government and healthcare agencies (Ornell, 2020)

In February of 2020 a survey was conducted polling 246 medical personnel who provided frontline clinical treatment, including EMS first responders, in order to identify anxiety and stress disorder scores and presence among them (Jizheng, 2020). Survey results are detailed in the article, "A survey of mental health of medical staff in new-type coronavirus pneumonia hospitals" (Jizheng, 2020). Of the 230 respondents, 53 were found to have anxiety and 63 had stress disorder. This article identified that the risk of occupational exposure to the new coronavirus was the reason for these high rates. It also highlights that increased stress and mental pressure was associated with the new personal protective equipment (PPE) and isolation requirements. Thus suggesting that for these individuals, getting adequate social support is an impossibility.

This article compares their survey results to others conducted following other tragedies or among other healthcare groups and reports that their findings of stress and anxiety reported are higher than the others, and uses this as evidence to advocate for considerable attention be given to supporting this population through this difficult time (Jizheng, 2020). The study results also

showed that anxiety scores were higher among nurses than doctors and hypothesized that to be a result of nurses working longer hours and having closer contact with patients leading to increased fatigue and nervousness (Jizheng, 2020). The most interesting finding reported, in my opinion, was that medical staff are not primarily worried by being directly affected by the virus, but by feelings of helplessness in many of the outcomes associated with uncooperative and critically ill patients. The article advocates for increased psychological skills training, social support, implementing intervention groups and offering psychological counseling to medical staff as needed and especially among female nurses who appear most affected.

A similar study in China, “Factors Associated With Mental Health Outcomes Among Health Care Workers Exposed to Coronavirus Disease 2019,” conducted a cross-sectional study of 1257 healthcare workers across 34 hospitals treating COVID-19 patients (Lai, 2020). Among respondents, 50.4% of individuals reported depression, 44.6% reported anxiety, 34.0% reported insomnia, and 71.5% reported distress (Lai, 2020). Comparable to the previous study, women, nurses, and front-line workers directly involved in diagnosis and treatment for suspected or confirmed COVID-19 patients seemed to me the most at risk for these health risks (Lai, 2020). Similarly, this article called for the implementation of psychological support and special intervention to help these individuals cope with the new pressures of their occupation.

A 2020 study, “Vicarious traumatization in the general public, members, and non-members of medical teams aiding in COVID-19 control,” compared the severity of vicarious traumatization among the general public, frontline nurses, and non-frontline nurses (Li, 2020). Vicarious traumatization often presents with “loss of appetite, fatigue, physical decline, sleep disorder, irritability, inattention, numbness, fear, and despair” and occurs as a result of sympathy for survivors of some trauma (Li, 2020, 2). Compared to the above results, surprisingly, this



study found that front-line-nurses had a lower severity than both the general public and non-frontline nurses (Li, 2020). No statistical difference was observed between the general public and non-frontline nurses.

This study reported limitations including: the subject population being mostly comprised of nurses, though they still considered this to be representative of COVID-19 medical teams, and the fact that the descriptive cross-sectional design of the study did not allow for causal links to be established among variables (Li, 2020). This article represented deviation from what may have been expected and from results presented in the above studies. It continued to advocate for psychological treatment for individuals affected by COVID-19, but included the general public in this population and did not place as strong an emphasis on the effects of COVID-19 on frontline or first responders.

COVID-19 has had profound effects on the mental health of healthcare workers and the general public alike. One intensive care unit (ICU) caring for COVID-19 patients though wants to remind everyone that hope is not lost. In the article, “Psychological stress of ICU nurses in the time of COVID-19,” one ward reiterates that front-line nurses are currently experiencing an extreme workload, fatigue, risk of infection, and sometimes frequent loss of patients and that all of this has led to nurses reporting loss of appetite, fatigue, difficulty sleeping, nervousness, recurrent crying and suicidal thoughts (Shen, 2020). But, they also describe in detail the early measures that were implemented in order to improve conditions for nurses, for example, adding a psychologist to each medical team. They recognize the need for regular follow-up to assess how this event may affect nurses psychologically in the long term, but report that today “nurses experienced no adverse events during the fight against COVID-19” (Shen, 2020, 1). They hope that the success conferred to their team as a result of deliberate policy changes can serve as a

useful template for other hospitals dealing with large-scale public health emergencies in the future.

### **Conclusion**

Considering society's dependence on first responders, it is critical to understand how their occupation affects their health and ability to function properly. This review serves as a composite of several pieces of literature, addressing the detrimental health outcomes as a result of occupational stress among first responders, proposing potential management strategies for coping with that stress, and contextualizing many of these concerns with what's going on in our world today.

The body of research demonstrating the occupational stress effects faced by first responders is significant. In many cases first responders face exhaustion, anxiety, depression, stress, and even PTSD and suicidal ideations. Additionally, their necessity in society, and therefore the need to defend them, is not questioned. However, the one review discussing treatment strategies for this population revealed a surprising paucity of research having been conducted with the purpose of determining the most effective stress management strategies among the first responder population (Haugen, 2012).

Several articles call for the support of friends, family, coworkers, and management and indicate that this type of support is integral and often extremely effective at guarding against some of the detrimental health effects of this group's occupational stress. Some believe though that this alone is not sufficient to help an individual manage their stress but agree that more research is needed to determine what precisely that alternative intervention strategy will look like.

For any of this to be possible though, the common thread across the majority of the papers reviewed in this document is that: a cultural shift is required. If first responders feel ashamed because they feel stress, anxiety, or depression they will not seek help when they need it. Or if they have not been educated on what the effects of their job can mean for their overall mental and physiological health they may not consider these as significant risks. Without proper education they may also be unable to even recognize these negative health effects in themselves, or their coworkers who may be in need of support as well. Finally, if first responders are seen as heroes, impervious to injury, then the need for further research will not be realized and the appropriate treatment will not be available when a first responder finally realizes they need it.

First responders play a critical role in protecting and caring for others, this is especially clear today. They are not invulnerable to injury themselves and they are often in the line of fire, so to speak, for incurring both physical and mental injury due to their taxing job requirements. Like other articles included herein, this review has found that further research and outreach are necessary to guard against additional loss of life among this population and to remove the stigma, both in the workplace and communities at large, for first responders seeking help.

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